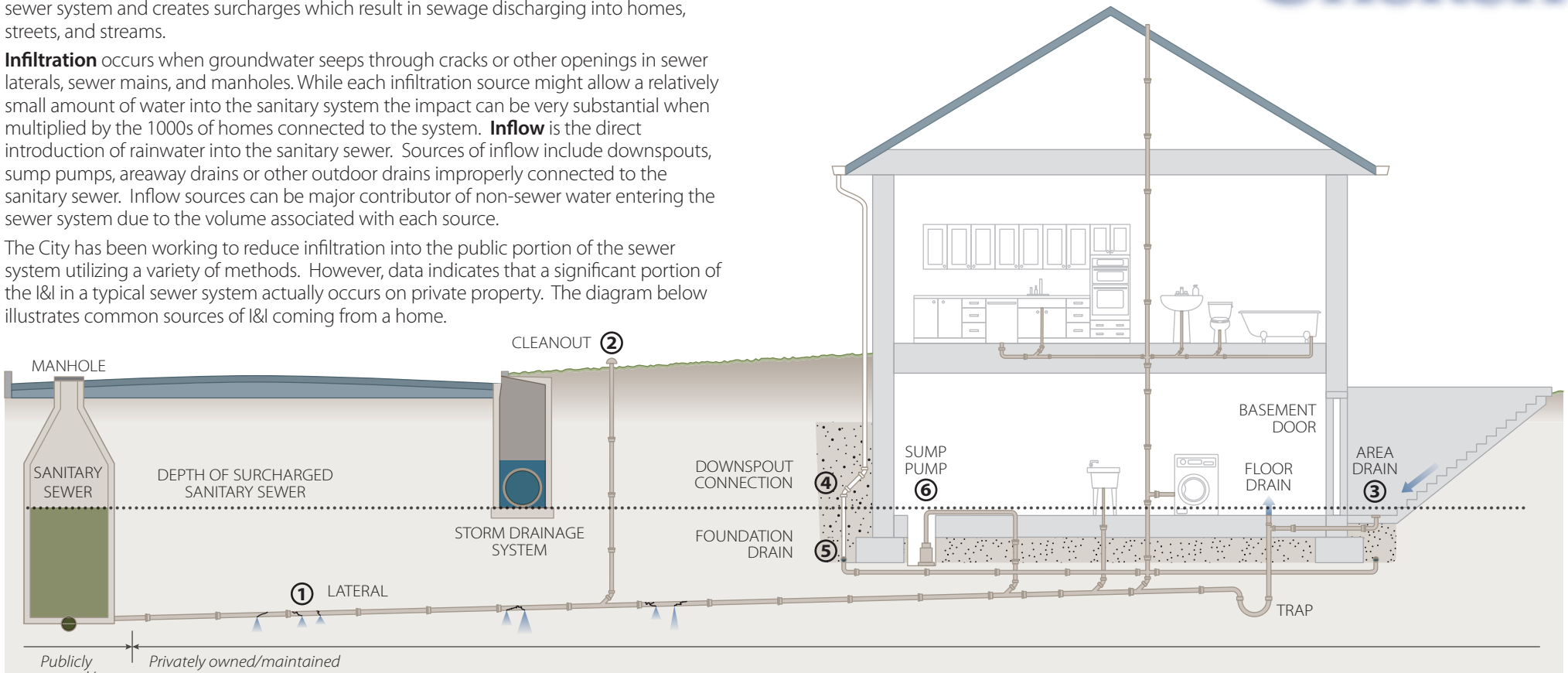
Sources of Sanitary Sewer Inflow & Infiltration

CITY OF FALLS CHURCH

Sanitary Sewer Infiltration and Inflow (I&I) are presumed by most experts to be the primary cause of most sewer backups throughout the country. Backups and overflows occur when rain and ground water enter the sanitary sewer system, especially during storm events. This rain and groundwater overwhelms the design capacity of the sanitary sewer system and creates surcharges which result in sewage discharging into homes, streets, and streams.

Infiltration occurs when groundwater seeps through cracks or other openings in sewer laterals, sewer mains, and manholes. While each infiltration source might allow a relatively small amount of water into the sanitary system the impact can be very substantial when multiplied by the 1000s of homes connected to the system. **Inflow** is the direct introduction of rainwater into the sanitary sewer. Sources of inflow include downspouts, sump pumps, areaway drains or other outdoor drains improperly connected to the sanitary sewer. Inflow sources can be major contributor of non-sewer water entering the sewer system due to the volume associated with each source.

The City has been working to reduce infiltration into the public portion of the sewer system utilizing a variety of methods. However, data indicates that a significant portion of the I&I in a typical sewer system actually occurs on private property. The diagram below illustrates common sources of I&I coming from a home.



①
Cracked lateral/ separated joints
Over time laterals can develop small cracks and separations between pipe segments that allow groundwater and rainwater to leak into a home's sewer lateral. These gaps can also lead to sinkholes, root blockages, and an eventual pipe collapse. Both types of defects should be addressed before they become an expensive emergency repair.

②
Cleanout defects
Cleanouts are access points for plumbers to clear sewer laterals in case of blockage. A cleanout cap located at the ground surface is a common source of inflow because it is easily damaged, misaligned, or even missing completely. If a cleanout is not sealed properly it allows debris and stormwater runoff from the yard to enter the sewer system.

③
Area drains
Prior to the 1970s it was common for area drains outside basement stairs and garages to be piped directly into a home's sewer system. New homes drain these areas with a sump pump that discharges into the yard or directly into a stormwater drainage system.

④
Downspout connections
Much like areas drains, home builders once connected downspouts to foundation drains that then drained into a home's sewer system. These types of connections can easily overwhelm a home's lateral and cause flooding inside the basement if a floor drain is present. When several homes in a neighborhood have downspouts connected to a sewer line, the sewer under the street can become overwhelmed. This can result in sewer surcharging into the basement of homes down the line.

⑤
Foundation drains
Foundation drains are perforated pipes installed along the foundation of a home. They are designed to intercept groundwater before it reaches the basement. Prior to the 1970s it was common for foundation drains to be connected to a home's sewer system. New homes are plumbed to a sump pump.

⑥
Sump pumps
Sump pumps have the potential to eject large volumes of groundwater, especially during rain events. Prior to the 1970s these were commonly connected to a home's sewer system. New homes discharge sump pumps into the yard or directly into a stormwater drainage system.

For more information contact the City of Falls Church Public Works at (703) 248-5350